REMARKS

Claims 1-3, 5-10, 12-17, 19-29, 31-39, and 41-46 are pending in the present Application. Claims 1-3, 5-10, 12-17, 19-29, and 31-36 have been withdrawn, no claims have been amended, leaving claims 37-39 and 41-46 for consideration upon entry of the present Response.

Reconsideration and allowance of the claims are respectfully requested in view of the following remarks.

Claim Rejections Under 35 U.S.C. § 102(e)

Claims 37-39 and 41-43 stand rejected under 35 U.S.C. § 102(e), as allegedly anticipated by US 6387981 to Zhang et al. ("Zhang"). Applicants respectfully traverse this rejection.

Zhang is generally directed to a dental material comprising a hardenable resin, a non-heavy metal oxide particle and a heavy metal oxide. (Zhang, Abstract) The non-heavy metal oxide particles can be silica particles, particularly fumed silica, colloidal silica, or aggregated silica particles. (Zhang, column 5) Furthermore, the non-heavy metal oxide particle and a heavy metal oxide can be a substantially amorphous cluster of these particles. (Zhang, column 14)

Independent claim 37 is directed to a filler prepared by drying an amorphous sol comprising silica nanoparticles having diameters of about 1 to about 50 nanometers, wherein the nanoparticles are in the form of chains having lengths of about 5 to about 400 nanometers, at a temperature and for a time effective to remove liquid therefrom; and heating the dried silica sol to a temperature and for a time effective to form at least one crystalline phase therein.

To anticipate a claim, a reference must disclose each and every element of the claim. *Lewmar Marine v. Varient Inc.*, 3 U.S.P.Q.2d 1766 (Fed. Cir. 1987).

The Applicants note that the cited reference fails to teach each and every limitation of independent claim 37. Specifically, the reference fails to teach i) drying an amorphous sol comprising silica nanoparticles in the form of chains having lengths of about 5 to about 400 nanometers; and ii) heating the dried silica sol to a temperature and for a time effective to form at least one crystalline phase within the resulting silica material.

Nowhere in Zhang are the silica particles described as being in the form of chains having lengths of about 5 to about 400 nanometers. Conventional silica sols are mostly monodispersed spherical particles rather than in the form of chains. (Jia declaration filed 8/20/07, page 3) Furthermore, the Examiner stated in the Office Action dated October 31, 2007 that Zhang does not teach silica in the form of chains: "Zhang differs in not teaching that fumed silica comprises chains of particles." (Office Action dated 10/31/07, page 4, fourth paragraph) Therefore, Zhang does not teach or even suggest use of silica particles in the form of chains having lengths of about 5 to about 400 nanometers to prepare a filler.

Secondly, Zhang fails to teach heating the dried silica sol to a temperature and for a time effective to form at least one crystalline phase within the resulting silica material. The silica disclosed in Zhang is not heated to a temperature and for a time to form the required crystalline phase. Indeed, the only mention of heating a silica is the heat treatment used in the manufacturing process to prepare the substantially amorphous cluster of non-heavy metal oxide and heavy metal oxide. (Zhang, column 14, line 10 to column 15, line 21) The result of Zhang's heat treatment is a substantially amorphous cluster essentially free of crystalline structure. (Zhang, column 14, lines 10-13 and 32-42)

Turning to the Response to Arguments section of the latest Office Action, the Examiner stated

> Applicant argues that Zhang does not teach heating a dried amorphous silica sol to form at least one crystalline phase.
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> However, it appears that Zhang teaches a method of heating a silica sol in accordance with the invention, which includes heating a silica sol at a temperature of 600°C (col. 14, 15).
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> It appears that Zhang teaches heat treating a substantially similar starting material as the claimed invention at a substantially similar temperature as that of the claimed invention such that the properties of the final product of Zhang are substantially similar to those of the claimed invention including at least one crystalline phase.

Final Office Action dated 9/22/08, page 2 and 3. The Applicants respectfully disagree.

Zhang does not teach heating a dried amorphous silica sol to form at least one crystalline phase. Zhang discloses in columns 14 to 15 a *substantially amorphous* cluster of non-heavy metal oxide (e.g., silica) and a heavy metal oxide. As disclosed "substantially amorphous" means "the clusters are essentially free of crystalline structure....[t]he fillers of the invention preferably have an index of less than about 0.1; more preferably less than about 0.05" on the Crystallinity Index where 1.0 is indicative of a full crystalline structure and "a value near zero indicates presence of amorphous phase only." (Zhang, Col. 14, lines 32-42) Zhang further teaches that the substantially amorphous clusters of non-heavy metal oxide and a heavy metal oxide are manufactured in a process that includes heat treatment. (Zhang, col. 14, lines 10-16 and 57-60) Thus, the heat treated substantially amorphous cluster of non-heavy metal oxide and a heavy metal oxide of columns 14-15 do not have a crystalline phase as a Crystallinity Index value near zero indicates the presence of amorphous phase only. The remaining disclosure of silica fillers in Zhang (i.e., columns 5-6) does not teach or suggest heating a dried silica sol to a temperature and for a time effective to form at least one crystalline phase.

Additionally, the Applicants could not find a disclosure in Zhang that teaches heating a silica sol at a temperature of 600°C either at column 14, 15, or elsewhere. It is noted that Zhang cites that the substantially amorphous cluster of non-heavy metal oxide and a heavy metal oxide is manufactured in a process that includes heat treatment. (Zhang, col. 14, lines 10-62) A temperature is not provided, however Zhang discloses U.S. Patent Application Serial No. 09/428,830 as disclosing the preferred clusters. The disclosed patent application, however, was not incorporated by reference in the Zhang reference. Therefore, regardless of whether the cited application discloses heating a silica sol at a temperature of 600°C, it cannot be applied under the present §102 rejection in combination with Zhang. Even with the combined teaching of Zhang and U.S. Patent Application Serial No. 09/428,830, the heat treatment disclosed in Zhang produces a material is a *substantially amorphous* cluster of non-heavy metal oxide and a heavy metal oxide and not a process to achieve a crystalline phase according to the instant claims.

In comparison, the instant claims require heating the dried silica sol to a temperature and for a time effective to form at least one crystalline phase within the resulting silica material. As shown in Example 8 of the Specification as filed, a colloidal silica sol containing silica particles in the form of chains was dried, pulverized in a mortar and pestle, and placed into an Al_2O_3 crucible and fired at about 800°C for about one hour. (Specification, paragraphs [0066]-[0067]) X-ray diffraction analysis revealed crystalline formation within the resulting silica material. (Specification, Figure 1) Such crystalline formation in a silica material is not disclosed in Zhang.

Thus, as Zhang fails to teach each and every limitation of independent claim 37, the Applicants respectfully request reconsideration and removal of the §102(e) rejections over claims 37-39 and 41-43.

Claim Rejections Under 35 U.S.C. § 103(a)

Claims 44-46 stand rejected under 35 U.S.C. § 103(a), as allegedly obvious over Zhang in view of US 4180911 to Bullock ("Bullock"). Applicants respectfully traverse this rejection.

Bullock generally teaches silane treated silica powder for dental fillers, particularly silane-treated amorphous silica. (Bullock, column 5, lines 64-65)

Claims 44-46 all ultimately depend from independent claim 37. As mentioned above, claim 37 requires two limitations not taught or suggested by Zhang: i) drying an amorphous sol comprising silica nanoparticles in the form of chains having lengths of about 5 to about 400 nanometers; and ii) heating the dried silica sol to a temperature and for a time effective to form at least one crystalline phase within the resulting silica material. Bullock, in combination with Zhang, also fails to teach or suggest these two required limitations. Indeed, Bullock specifically discloses silane treated amorphous silica and not a silane treated silica material having at least one crystalline phase. As the combined references fail to teach or suggest all of the required claim limitations of claim 37, the references have not rendered obvious claims 44-46. Reconsideration and withdrawal of the rejections are respectfully requested.

It is believed that the foregoing remarks fully comply with the Office Action and that the claims herein should now be allowable to Applicants. Accordingly, reconsideration and withdrawal of the rejections and allowance of the case are respectfully requested. The Examiner is invited to contact the attorney of record below to discuss the instant Response as a means to advance prosecution in the instant case.

If there are any additional charges with respect to this Response or otherwise, please charge them to Deposit Account No. 06-1130.

Respectfully submitted,

CANTOR COLBURN LLP

By____________________
Roberta L. Pelletier, Esq.
Registration No. 46,372

Date: November 24, 2008
CANTOR COLBURN LLP
20 Church Street, 22nd floor
Hartford, CT 06103-3207
Telephone: (860) 286-2929
Facsimile: (860) 286-0115
Customer No.: 23413